BRIEFER ARTICLES.

PRECURSORY LEAF SERRATIONS OF ULMUS.

(WITH TWO FIGURES)

IT is a commonly accepted fact that embryonic plant tissue is mostly devoid of intercellular air spaces, and that gas interchange is accomplished from cell to cell by means of water which contains the necessary gases in solution. Such tissues are generally small in bulk, so that the most deeply lying cells are not widely distant from the outside atmosphere. Intercellular air spaces develop as the embryonic tissue increases in size, until at maturity an intricate system of passages, connecting with the atmosphere through stomata, insures proper aeration.

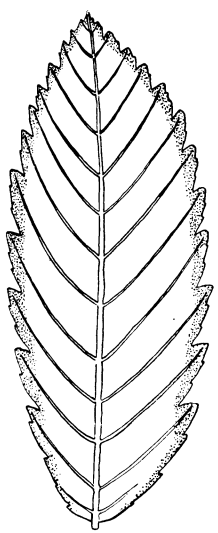

FIG. 1.—Young leaf of *Ulmus alata;* shaded regions are those in which spongy parenchyma has developed.

Leaves in which air spaces are prominently developed to assist the process of photosynthesis form no exception to the rule. Tissues of young leaves are compact, and form air passages during their growth after emergence from the bud scales. While wide observation is perhaps lacking to support the view that the air spaces arise uniformly over the entire leaf, it is generally accepted as true.

RACIBORSKI[1] has shown, however, that the leaves of certain lianas have a part which develops air spaces and stomata and hence becomes functional in advance of the main portion of the leaf. Such an organ he calls a *Vorläuferspitze*, and it consists of a slender, pointed prolongation of the blade, from which it is partially separated by a slight constriction. It appears that the purpose of the organ is to begin the process of photosynthesis as early as possible, which would help to accelerate the development of the main portion of the leaf.

While no such well-differentiated leaf organ is reported from plants living in temperate latitudes, it seems certain that spongy parenchyma does not always develop simultaneously over all parts of the leaf. An exception

[1] RACIBORSKI, M., Ueber die Vorläuferspitze. Flora **87**: 1–37. 1900.

is to be found in Ulmus, the serrations of whose leaves become functional when the latter are still very small, or about the time they are emerging from the bud scales. It is not necessary to cut sections to observe this phenomenon, for the leaf margins are of a deep green color, which contrasts strongly with the pale yellowish-green of the remaining portion (*fig. 1*). The serrations appear slightly swollen as though the leaf were thicker in this region than elsewhere. The color contrast remains for a considerable time, or until the leaf has nearly reached its full size.

It requires but a section of a young Ulmus leaf to prove that the serrations really have fully developed spongy parenchyma and functional stomata, while adjacent and other portions of the leaf consist of compact

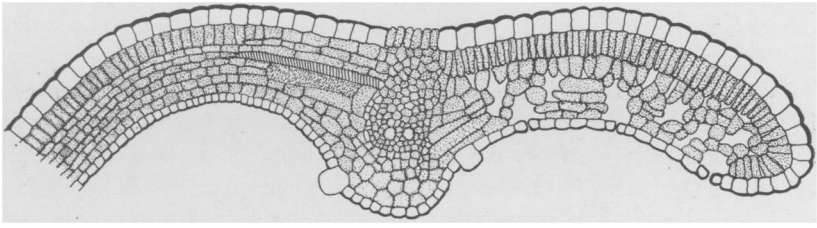

FIG. 2.—Cross-section of a leaf at the margin; the spongy parenchyma on the right is readily distinguishable from the compact embryonic tissue on the left.

tissue. In *fig. 2* it will be seen that in the right or marginal portion of the section the air spaces are such as would be found in any ordinary mature mesophytic leaf; while on the left of the section, which lies toward the midrib, there will be seen regular rows of cells compactly arranged and evidently in embryonic condition. It will also be noticed that the marginal portion is thicker, in consequence of the development of air spaces.

It is probable that other instances of precursory leaf serrations will be found, in fact one other was found by the writer, but it was not so well marked a case as that of Ulmus.—FREDERICK H. BILLINGS, *Louisiana State University, Baton Rouge, La.*

THE EFFECT OF DIFFERENT SOILS ON THE DEVELOPMENT OF THE CARNATION RUST.

VARIOUS ideas are held in regard to the rusting of plants, especially the small grains, and to a limited extent asparagus, carnations, and chrysanthemums. The conditions which favor the rusting of such plants as the carnation and the chrysanthemum, plants grown in the greenhouse for the most part, are probably better understood than those which favor the rusting of field crops. However, the conditions that would tend to bring